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## FIN1027 / FIN1027A — 3.3V LVDS, 2-Bit, High-Speed, Differential Driver

### Features


- Greater than 600Mbps Data Rate
- 3V Power Supply Operation
- 5ns Maximum Differential Pulse Skew
- 1.5ns Maximum Propagation Delay
- Low Power Dissipation
- Power-Off Protection
- Meets or Exceeds the TIA/EIA-644 LVDS Standard
- Flow-through Pinout Simplifies PCB Layout

### Description

This dual driver is designed for high-speed interconnects utilizing Low Voltage Differential Signaling (LVDS) technology. The driver translates LVTTTL signal levels to LVDS levels with a typical differential output swing of 350mV, which provides low EMI at ultra-low power dissipation, even at high frequencies. This device is ideal for high-speed transfer of clock or data.

The FIN1027 or FIN1027A can be paired with its companion receiver, the FIN1028, or with any other LVDS receiver.

### Ordering Information

Part Number	Operating Temperature Range	 Eco Status	Package	Packing Method
FIN1027M	-40 to +85°C	Green	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Trays
FIN1027MX	-40 to +85°C	Green	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Tape and Reel
FIN1027K8X	-40 to +85°C	RoHS	8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide	Tape and Reel
FIN1027AMX	-40 to +85°C	Green	8-Lead Small Outline Package (SOIC) JEDEC MS-012, 0.150 inch Narrow	Tape and Reel

 For Fairchild's definition of Eco Status, please visit: [http://www.fairchildsemi.com/company/green/rohs\\_green.html](http://www.fairchildsemi.com/company/green/rohs_green.html).

## Pin Configuration

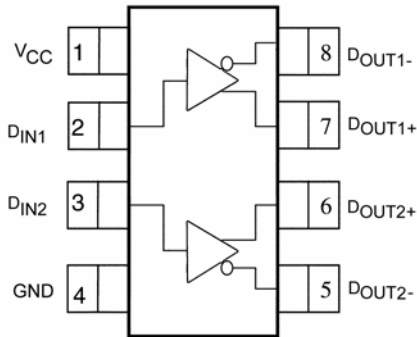


Figure 1. FIN1027 SOIC Pin Assignment (Top View)

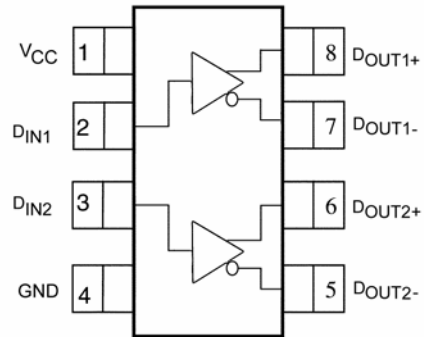


Figure 2. FIN1027A SOIC Pin Assignment (Top View)

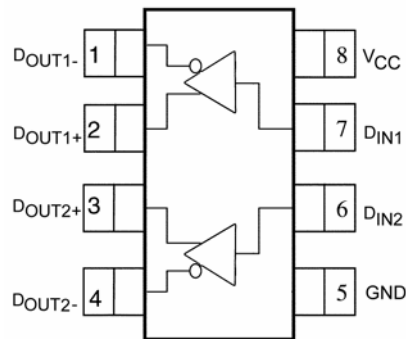


Figure 3. FIN1027 US8 Pin Assignment (Top View)

## Pin Definitions

Name	Pin # FIN1027 SOIC	Pin # FIN1027A SOIC	Pin # FIN1027 US8	Description
V <sub>CC</sub>	1	1	8	Power Supply
D <sub>IN1</sub>	2	2	7	LVTTTL Data Input
D <sub>IN2</sub>	3	3	6	LVTTTL Data Input
GND	4	4	5	Ground
D <sub>OUT2-</sub>	5	5	4	Inverting Driver Output
D <sub>OUT2+</sub>	6	6	3	Non-Inverting Driver Output
D <sub>OUT1+</sub>	7	8	2	Non-Inverting Driver Output
D <sub>OUT1-</sub>	8	7	1	Inverting Driver Output

## Function Table

Input	Outputs	
D <sub>IN</sub>	D <sub>OUT+</sub>	D <sub>OUT-</sub>
LOW	LOW	HIGH
HIGH	HIGH	LOW
OPEN	LOW	HIGH

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply Voltage	-0.5	4.6	V
D <sub>IN</sub>	DC Input Voltage	-0.5	6.0	V
D <sub>OUT</sub>	DC Output Voltage	-0.5	4.7	V
I <sub>OSD</sub>	Driver Short-Circuit Current	Continuous		mA
T <sub>STG</sub>	Storage Temperature Range	-65	+150	°C
T <sub>J</sub>	Maximum Junction Temperature		+150	°C
T <sub>L</sub>	Lead Temperature, Soldering, 10 Seconds		+260	°C
ESD	Human Body Model, JESD22-A114		≥6500	V
	Machine Model, JESD22-A115		≥400	

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply Voltage	3.0	3.6	V
V <sub>IN</sub>	Input Voltage	0	V <sub>CC</sub>	V
T <sub>A</sub>	Operating Temperature	-40	+85	°C

## DC Electrical Characteristics

All typical values are at  $T_A = 25^\circ\text{C}$  and  $V_{CC} = 3.3\text{V}$ . Over-supply voltage and operating temperature ranges, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$V_{OD}$	Output Differential Voltage	$R_L = 100\Omega$ , Figure 4	250	350	450	mV
$\Delta V_{OD}$	$V_{OD}$ Magnitude Change from Differential LOW-to-HIGH				25	mV
$V_{OS}$	Offset Voltage		1.125	1.250	1.375	V
$\Delta V_{OS}$	Offset Magnitude Change from Differential LOW-to-HIGH				25	mV
$I_{OFF}$	Power-Off Output current	$V_{CC} = 0\text{V}$ , $V_{OUT} = 0\text{V}$ or $3.6\text{V}$			$\pm 20$	$\mu\text{A}$
$I_{OS}$	Short-Circuit Output Current	$V_{OUT} = 0\text{V}$			-8	mA
		$V_{OD} = 0\text{V}$			$\pm 8$	
$V_{IH}$	Input HIGH Voltage		2.0		$V_{CC}$	V
$V_{IL}$	Input LOW Voltage		GND		0.8	V
$I_{IN}$	Input Current	$V_{IN} = 0\text{V}$ or $V_{CC}$			$\pm 20$	$\mu\text{A}$
$I_{I(OFF)}$	Power-Off Input Current	$V_{CC} = 0\text{V}$ , $V_{IN} = 0\text{V}$ or $3.6\text{V}$			$\pm 20$	$\mu\text{A}$
$V_{IK}$	Input Clamp Voltage	$I_{IK} = -18\text{mA}$	-1.5			V
$I_{CC}$	Power Supply Current	No Load, $V_{IN} = 0\text{V}$ or $V_{CC}$			12.5	mA
		$R_L = 100\Omega$ , $V_{IN} = 0\text{V}$ or $V_{CC}$			17.0	
$C_{IN}$	Input Capacitance			4		pF
$C_{OUT}$	Output Capacitance			6		pF

## AC Electrical Characteristics

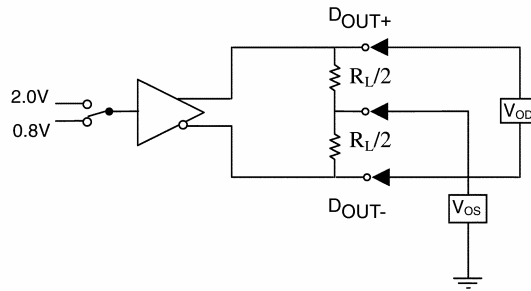
All typical values are at  $T_A = 25^\circ\text{C}$  and  $V_{CC} = 3.3\text{V}$ . Over-supply voltage and operating temperature ranges, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$t_{PLHD}$	Differential Propagation Delay, LOW-to-HIGH	$R_L = 100\Omega$ , $C_L = 10\text{pF}$ , Figure 5, Figure 6	0.5		1.5	ns
$t_{PHLD}$	Differential Propagation Delay, HIGH-to-LOW		0.5		1.5	ns
$t_{TLHD}$	Differential Output Rise Time (20% to 80%)		0.4		1.0	ns
$t_{THLD}$	Differential Output Fall Time (80% to 20%)		0.4		1.0	ns
$t_{SK(P)}$	Pulse Skew $ t_{PLH} - t_{PHL} $				0.5	ns
$t_{SK(LH)}, t_{SK(HL)}$	Channel-to-Channel Skew <sup>(1)</sup>				0.3	ns
$t_{SK(PP)}$	Part-to-Part Skew <sup>(2)</sup>				1.0	ns

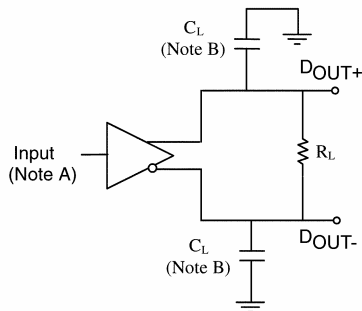
### Notes:

- $t_{SK(LH)}$ ,  $t_{SK(HL)}$  is the skew between specified outputs of a single device when the outputs have identical loads and are switching in the same direction.
- $t_{SK(PP)}$  is the magnitude of the difference in propagation delay times between any specified terminals of two devices switching in the same direction (either LOW-to-HIGH or HIGH-to-LOW) when both devices operate with the same supply voltage, same temperature, and have identical test circuits.

## Test Diagrams



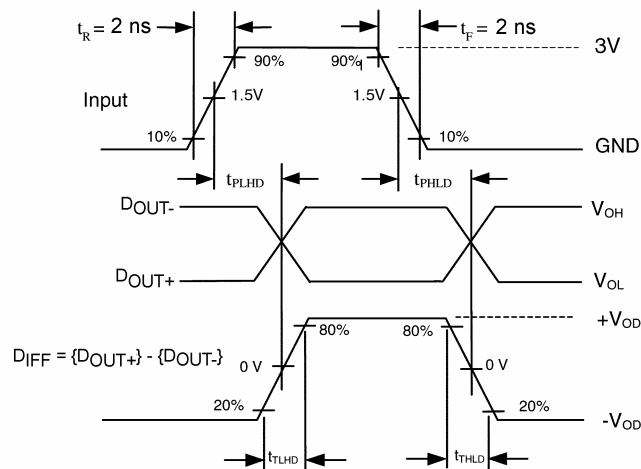
**Figure 4. Differential Driver DC Test Circuit**



Note A: All input pulses have frequency = 10MHz,  $t_R$  or  $t_F = 2ns$ .

Note B:  $C_L$  includes all probe and fixture capacitances.

**Figure 5. Differential Driver Propagation Delay and Transition Time Test Circuit**



**Figure 6. AC Waveforms**

## Typical Performance Characteristics

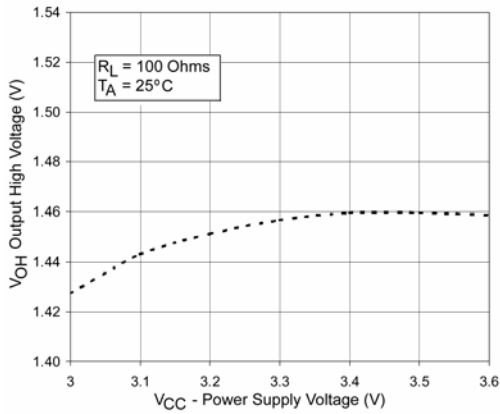


Figure 7. Output High Voltage vs. Power Supply Voltage

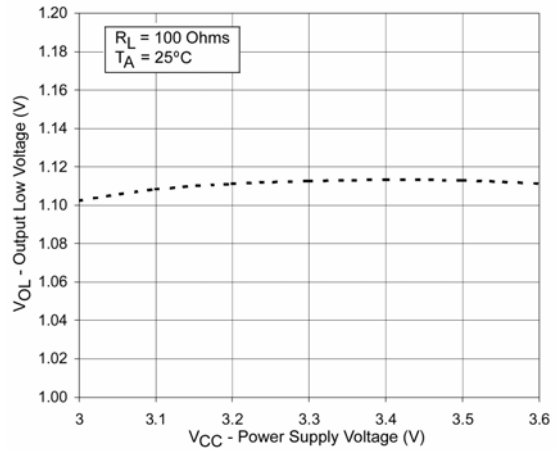


Figure 8. Output Low Voltage vs. Power Supply Voltage

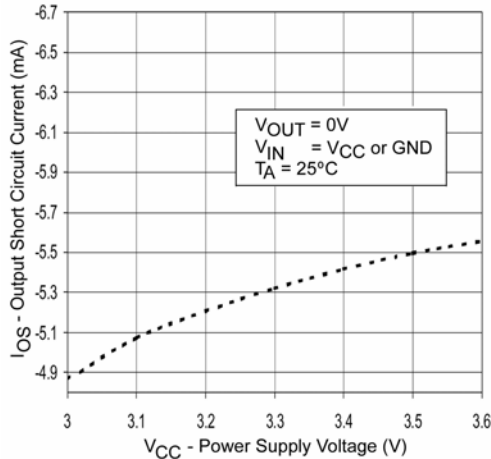


Figure 9. Output Short Circuit Current vs. Power Supply Voltage

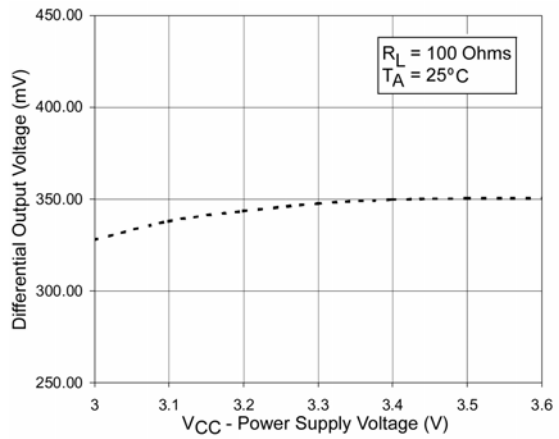


Figure 10. Differential Output Voltage vs. Power Supply Voltage

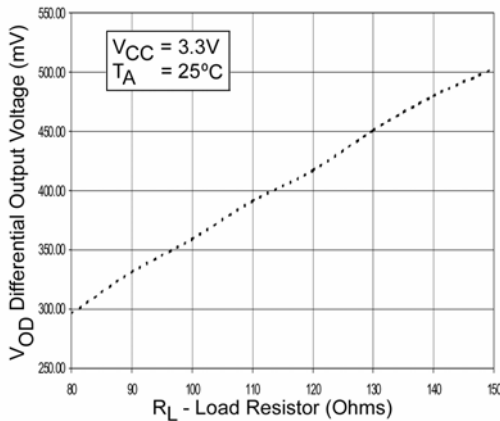


Figure 11. Differential Output Voltage vs. Load Resistor

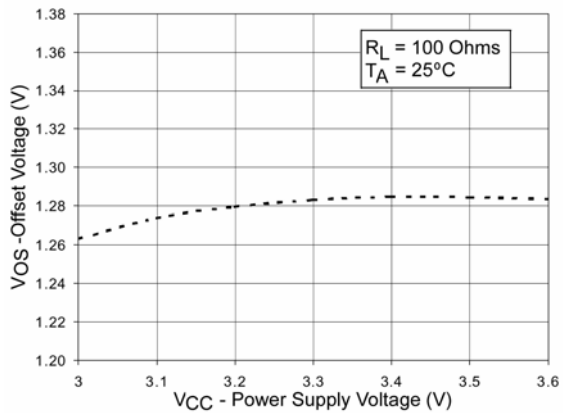
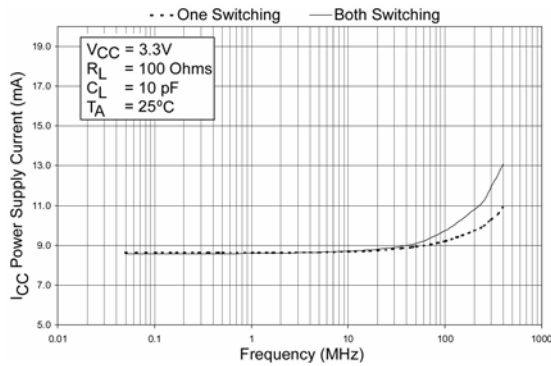
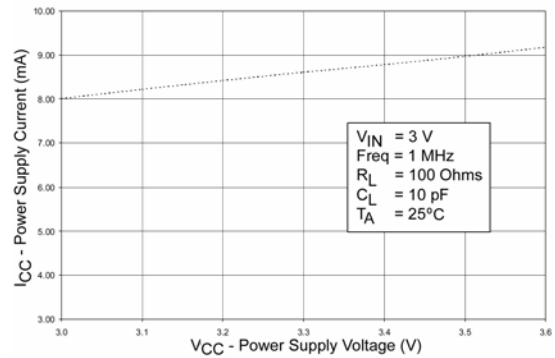


Figure 12. Offset Voltage vs. Power Supply Voltage

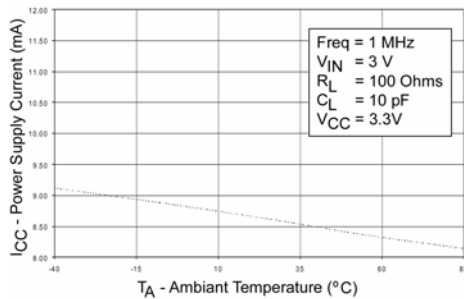
### Typical Performance Characteristics (Continued)



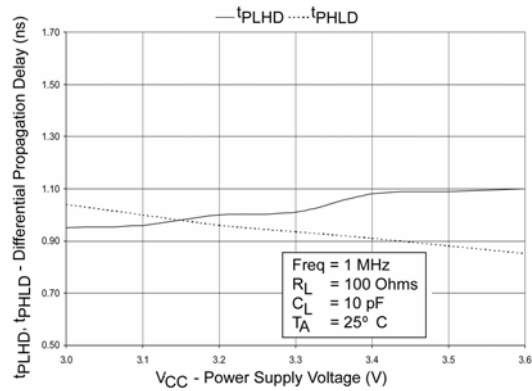
**Figure 13. Power Supply Current vs. Frequency**



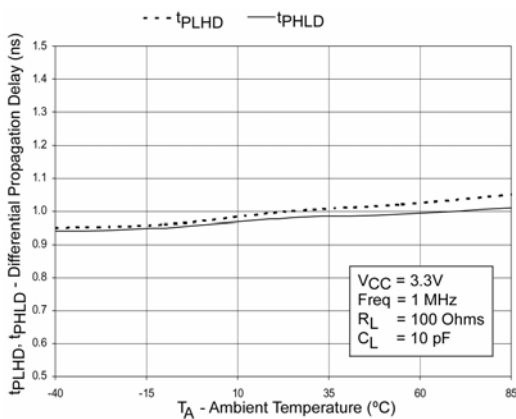
**Figure 14. Power Supply Current vs. Power Supply Voltage**



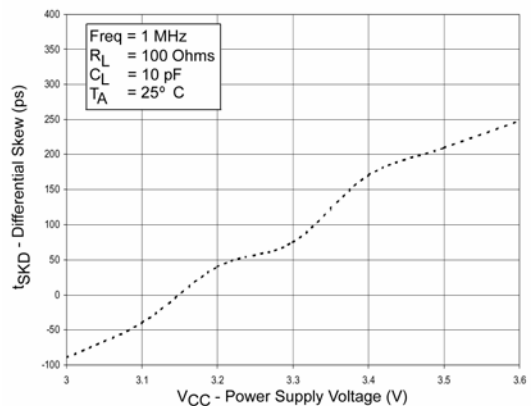
**Figure 15. Power Supply Current vs. Ambient Temperature**



**Figure 16. Differential Propagation Delay vs. Power Supply**



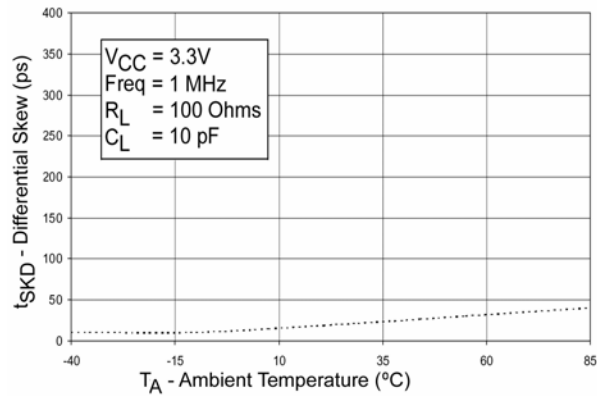
**Figure 17. Differential Propagation Delay vs. Ambient Temperature**



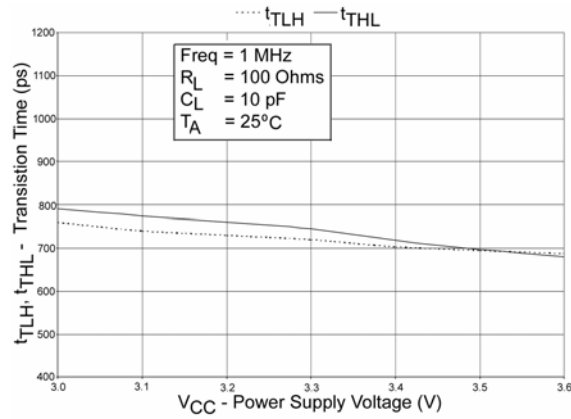
**Figure 18. Differential Skew ( $t_{PLH}-t_{PHL}$ ) vs. Power Supply**



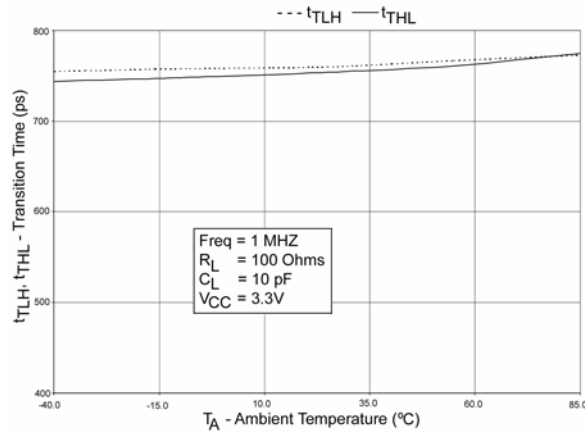
**Typical Performance Characteristics** (Continued)



**Figure 19. Differential Pulse Skew ( $t_{PLH}$ - $t_{PHL}$ )**



**Figure 20. Transition Time vs. Power Supply Voltage**



**Figure 21. Transition Time vs. Ambient Temperature**

Physical Dimensions

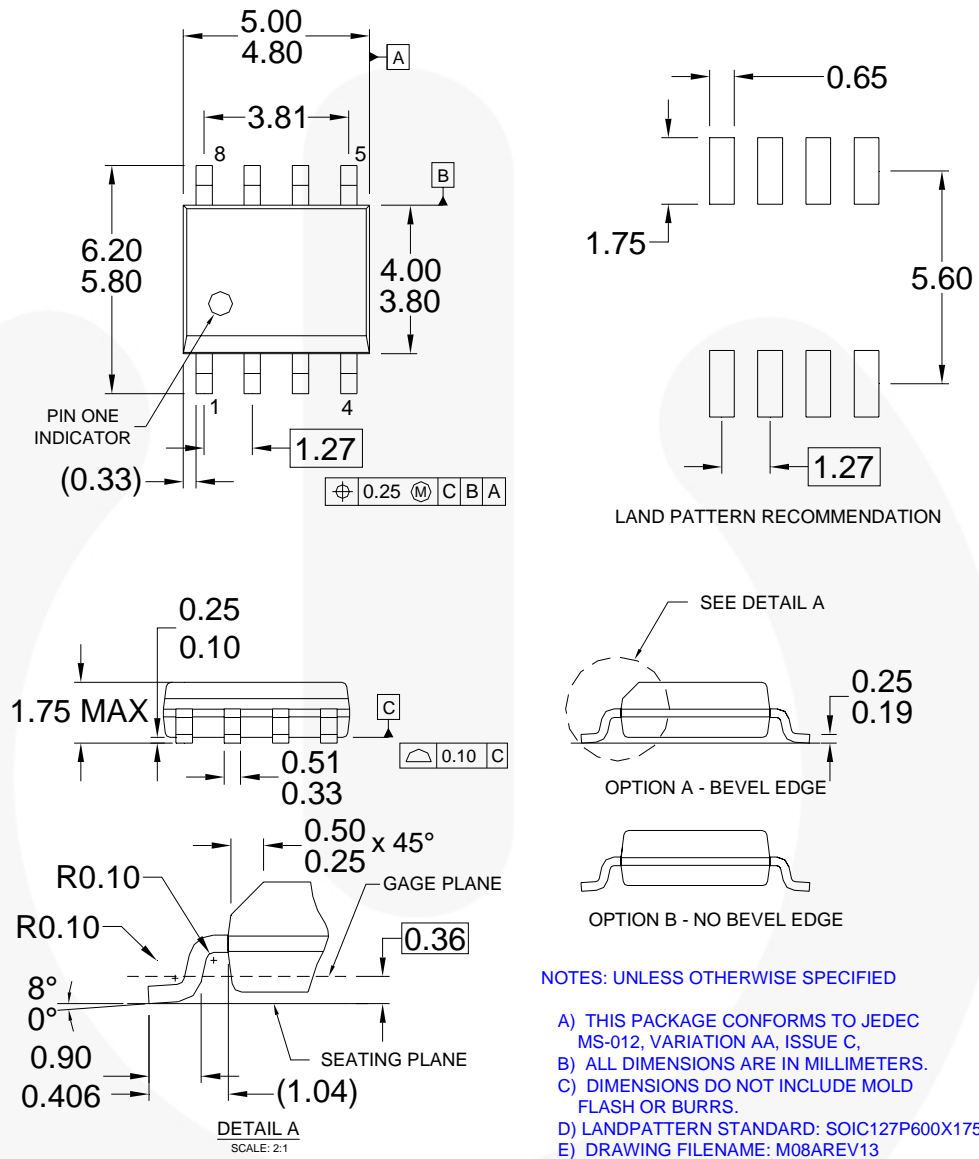


Figure 22. 8-Lead, Small Outline Package (SOIC), JEDEC MS-012, 0.150-inch, Narrow Body

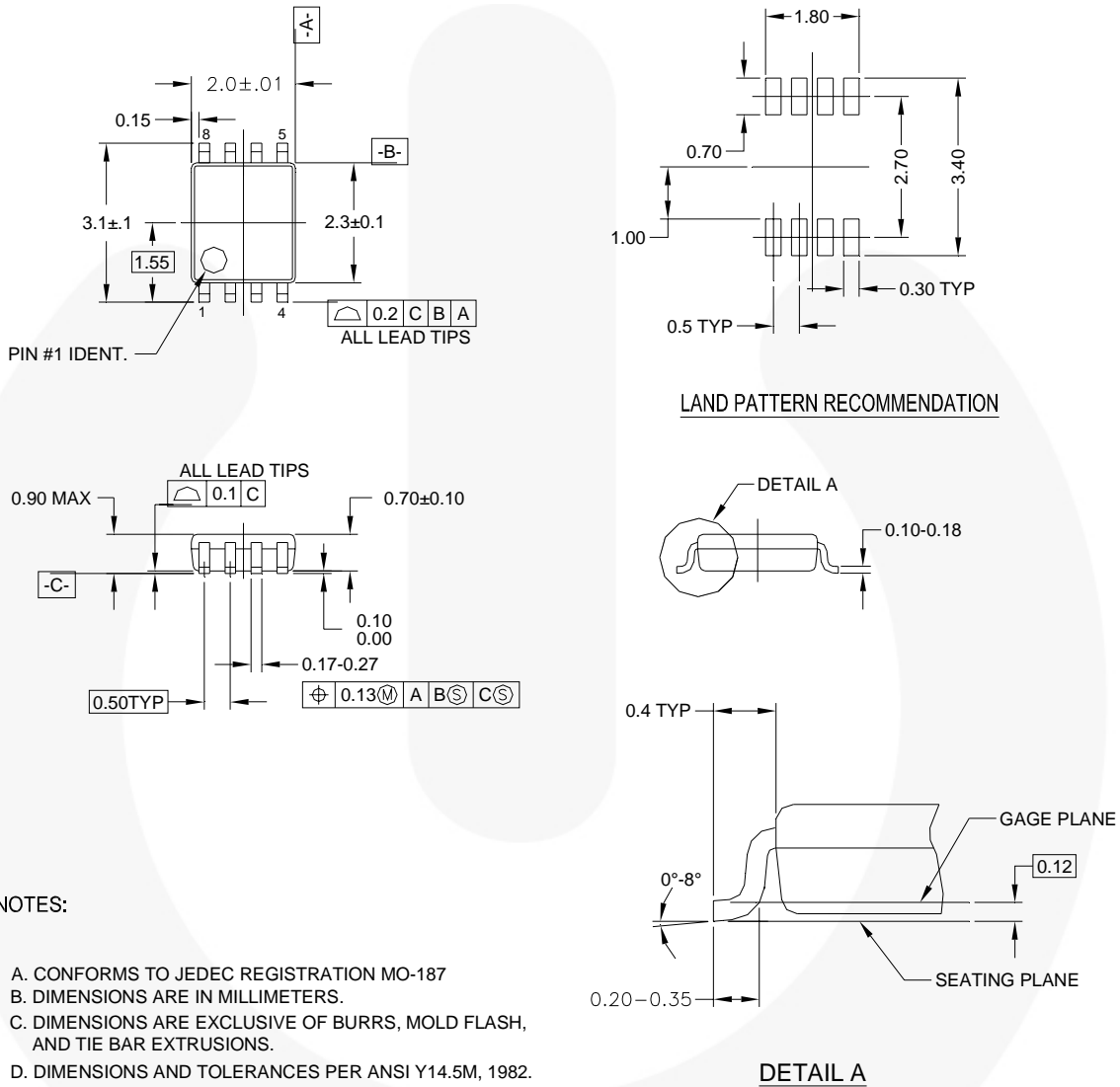
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Physical Dimensions



NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-187
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- D. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M, 1982.

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Figure 23. 8-Lead US8, JEDEC MO-187, Variation CA 3.1mm Wide

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